

WHAT IS CLAIMED IS:

1. An image forming apparatus comprising:  
plural image forming sections; and  
a carrying belt on which primary images formed on the plural image forming sections respectively are transferred and superimposed,  
wherein the image forming apparatus further comprises:  
a test pattern forming device for forming test patterns on the carrying belt by using the plural image forming sections;  
a pattern sensor for reading a test pattern on the carrying belt;  
a positional shift calculating device for calculating positional shift quantity of main scanning direction and that of sub scanning direction basing on read result by the pattern sensor with respect to at least one correction target color;  
a correction quantity determining device for determining correction quantity of each scanning direction with respect to a correction target color(s) basing on positional shift quantity of each scanning direction calculated by the positional shift calculating device and reliability coefficient of each scanning direction; and  
a positional correction device for conducting positional correction basing on correction quantity determined by the correction quantity determining device

with respect to an images of a correction target color(s), out of respective images to be formed by the plural image forming sections, and

reliability coefficients used by the correction quantity determining device differ by a main scanning direction and a sub scanning direction.

2. An image forming apparatus according to claim 1, wherein, for forming a test pattern by the test pattern forming device, there are:

a first correction mode for forming a test pattern which is as long as one round or more of the carrying belt; and

a second correction mode for forming a test pattern which is shorter than one round of the carrying belt.

3. An image forming apparatus according to claim 2, wherein the correction quantity determining device uses:

1, as reliability coefficient with respect to both positional shift quantity of main scanning direction and that of sub scanning direction obtained under first correction mode;

a positive value same as or smaller than 1, as reliability coefficient of main scanning direction with respect to positional shift quantity obtained under second correction mode; and

a positive value same as or smaller than reliability

coefficient of main scanning direction for second correction mode, as reliability coefficient of sub scanning direction with respect to positional shift quantity obtained under second correction mode.

4. An image forming apparatus according to claim 3 further comprising:

a temperature information obtaining unit for obtaining information of temperature inside of the image forming apparatus; and

a reliability coefficient determining device for determining reliability coefficient of sub scanning direction under second correction mode that is used at the correction quantity determining device basing temperature information obtained by the temperature information obtaining unit.

5. An image forming apparatus according to claim 3, wherein the correction quantity determining device uses a fixed value same as or higher than 0.8 as reliability coefficient of main scanning direction for second correction mode.

6. An image forming apparatus according to claim 4, wherein the correction quantity determining device uses a fixed value same as or higher than 0.8 as reliability coefficient of main scanning direction for second correction

mode.

7. An image forming apparatus according to claim 4, further comprising a history recording unit for recording a history of positional quantity that the positional shift quantity calculating device calculated in the past, wherein the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on difference of recent predetermined times of history representative value of positional shift quantity recorded on the history recording unit and positional shift quantity that the positional shift calculating device has calculated this time.

8. An image forming apparatus according to claim 5, further comprising a history recording unit for recording a history of positional quantity that the positional shift quantity calculating device calculated in the past, wherein the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on difference of recent predetermined times of history representative value of positional shift quantity recorded on the history recording unit and positional shift quantity that the positional shift calculating device has calculated this time.

9. An image forming apparatus according to claim 6, further comprising a history recording unit for recording a history of positional quantity that the positional shift quantity calculating device calculated in the past, wherein the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on difference of recent predetermined times of history representative value of positional shift quantity recorded on the history recording unit and positional shift quantity that the positional shift calculating device has calculated this time.

10. An image forming apparatus according to claim 7, wherein the history recording unit records a history of positional shift quantity calculated under first correction mode.

11. An image forming apparatus according to claim 8, wherein the history recording unit records a history of positional shift quantity calculated under first correction mode.

12. An image forming apparatus according to claim 7, wherein the history recording unit records positional shift quantity classifying by temperature band

basing on temperature information that the temperature information obtaining unit obtained when positional shift quantity is calculated, and

the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on predetermined times of recent histories of a temperature band to which temperature information obtained this time belongs, out of plural positional shift quantity recorded in the history recording unit.

13. An image forming apparatus according to claim 8, wherein the history recording unit records positional shift quantity classifying by temperature band basing on temperature information that the temperature information obtaining unit obtained when positional shift quantity is calculated, and

the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on predetermined times of recent histories of a temperature band to which temperature information obtained this time belongs, out of plural positional shift quantity recorded in the history recording unit.

14. An image forming apparatus according to claim 10, wherein the history recording unit records

positional shift quantity classifying by temperature band basing on temperature information that the temperature information obtaining unit obtained when positional shift quantity is calculated, and

the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on predetermined times of recent histories of a temperature band to which temperature information obtained this time belongs, out of plural positional shift quantity recorded in the history recording unit.

15. An image forming apparatus according to claim 11, wherein the history recording unit records positional shift quantity classifying by temperature band basing on temperature information that the temperature information obtaining unit obtained when positional shift quantity is calculated, and

the reliability coefficient determining device determines sub scanning directional reliability coefficient for second correction mode basing on predetermined times of recent histories of a temperature band to which temperature information obtained this time belongs, out of plural positional shift quantity recorded in the history recording unit.

16. An image forming apparatus according to claim 10

further comprising an updating device for updating contents of record in the history recording unit when the positional shift calculating unit calculates positional shift quantity under first correction mode,

wherein the correction quantity determining device determines correction quantity for first correction mode basing on a representative value of predetermined times of recent histories after being updated by the updating device.

17. An image forming apparatus according to claim 11 further comprising an updating device for updating contents of record in the history recording unit when the positional shift calculating unit calculates positional shift quantity under first correction mode,

wherein the correction quantity determining device determines correction quantity for first correction mode basing on a representative value of predetermined times of recent histories after being updated by the updating device.

18. An image forming apparatus according to claim 14 further comprising an updating device for updating contents of record in the history recording unit when the positional shift calculating unit calculates positional shift quantity under first correction mode,

wherein the correction quantity determining device determines correction quantity for first correction mode basing on a representative value of predetermined times of



recent histories after being updated by the updating device.

19. An image forming apparatus according to claim 15 further comprising an updating device for updating contents of record in the history recording unit when the positional shift calculating unit calculates positional shift quantity under first correction mode,

wherein the correction quantity determining device determines correction quantity for first correction mode basing on a representative value of predetermined times of recent histories after being updated by the updating device.

20. Image forming method using plural image forming sections and a carrying belt on which primary images formed on the plural image forming sections respectively are transferred and superimposed, the image forming method comprising the steps of:

forming test patterns on the carrying belt by using the plural image forming sections;

reading a test pattern on the carrying belt with a pattern sensor;

calculating positional shift quantity of main scanning direction and that of sub scanning direction basing on read result by the pattern sensor with respect to at least one correction target color;

determining correction quantity of each scanning direction with respect to a correction target color(s) basing

on positional shift quantity of each scanning direction and reliability coefficient of each scanning direction; and conducting positional correction basing on determined correction quantity, out of respective images to be formed by the plural image forming sections, wherein reliability coefficients used for determining correction quantity differ by a main scanning direction and a sub scanning direction.